

REMARKS

This amendment responds to the office action dated June 29, 2005.

The Examiner rejected claims 1-14, 17-19, 21-25, 30-32, 34, 35, 40-42, 50-65, 67-72, and 75-85 under 35 U.S.C. § 102(e) as being anticipated by Sukthankar et al., U.S. Patent No. 6,753,907 (hereinafter Sukthankar). The Examiner rejected the remaining claims under 35 U.S.C. § 103(a) as being obvious in view of the combination of Sukthankar with either Hasegawa, U.S. Patent No. 6,598,987 or Geng, U.S. Patent No. 6,700,669.

Independent claim 1, as amended, includes the limitations of “using an imaging device to sense at least two boundaries defining a projection screen, said imaging device being integral with said projector” and “wherein *said* imaging device is free from being the projector optics from which said image is projected from said projector.” The Examiner contends that each limitation is disclosed by Sukthankar (see rejection of claims 1 and 9). The Examiner is incorrect because the passage from Sukthankar relied upon to cite a disclosure of an imaging device integral with the projector describes an embodiment where the projector’s lens doubles as an imaging device, in which case the imaging device would no longer be free from being the projector optics. Thus, while Sukthankar discloses one embodiment where the imaging device is a camera separate from the projector and another embodiment where the imaging device is the projector lens, the Examiner cannot contend that both quoted limitations are disclosed by Sukthankar. Therefore, independent claim 1, as well as its dependent claims 2-8 are distinguishable over the cited prior art and should be allowable.

Dependent claim 9 has been canceled, its limitation being incorporated into independent claim 1.

Independent claim 10, as amended, includes the limitations of “initiating a keystone adjustment process by a user input at a location other than said projector” “adjusting the focus of said projector in response to said user input” and “wherein steps (b) through (e) are free from user input apart from initiating said keystone adjustment process.” This claim is distinguishable over Sukthankar for two reasons. First, that reference does not disclose adjusting the focus of a projector in response to a user input at a location other than the projector. *See* Sukthankar at col. 5 lines 56-58 (the only hardware interface disclosed by the reference capable of such a function is the projector). Second, and more importantly, Sukthankar does not disclose auto-focusing the projector lens and adjusting for a keystone image in response to a single user input. Although the reference indicates that auto-focusing can occur after user input at the projector, and “fully automatic” keystone adjustment occurring thereafter, the term “fully automatic” is explained as merely being “without user interaction” where the user “manually identifies [calibration] regions in the camera image.” In other words, to initiate the keystone adjustment process after auto-focusing, some user input would be required at a laptop or other computer. Sukthankar discloses no means by which the computer could itself initiate the keystone adjustment process in response to auto-focusing, but merely indicates that optimal performance of the keystone adjustment would occur if the image were first auto-focused, and indicates that the user would have to initiate auto-focusing using means at the projector, means which is not part of the system

disclosed by Sukthankar. Therefore, for both of these reasons, independent claim 10 and its dependent claims 11-17 are distinguishable over the cited prior art and should be allowable.

Independent claim 18, as amended, includes the limitations of “adjusting the focus of said projector in response to initiating said keystone adjustment process . . . free from user input apart from initiating said keystone adjustment process. Thus, independent claim 18, as well as its dependent claims 19-23, are distinguishable over the cited art for the second reason cited with respect to independent claim 10, argued in detail in the preceding paragraph.

Independent claim 24 includes the limitation of “repeating steps (b) through (d) while said user continuously maintains said desired keystone adjustment using a pointer directed at a projected said image.” The Examiner contends (with respect to canceled claim 27, the limitation of which has been incorporated into independent claim 24) that this limitation is disclosed by the secondary reference Hasegawa. It is not. Hasegawa merely discloses the use of a pointer to be used *during a presentation of images to an audience*, whereby the pointer includes an LED light panel directed at an infrared sensor, such that an arrow may be projected on the screen pointing towards an arbitrary user-selected object on the screen, without the pointer simultaneously obscuring the screen. Hasegawa’s pointer is not disclosed to be used *during a keystone adjustment process*, hence the cited combination does not disclose the claimed *functional* aspect of the claimed pointer, i.e. *maintaining said desired keystone adjustment*. The Examiner’s rejection of claim 27 to the contrary, independent claim 24, as well as its dependent claims 25, 26, and 28-33, patentably distinguishes over the cited prior art and should be allowable.

Independent claim 34, as amended, includes the limitation of “repeating steps (b) through (d) while said user maintains said desired ratio modification using a pointer directed at a projected said image.” Thus, independent claim 34, along with its dependent claims 35, 36, and 38-43 are distinguishable over the cited prior art for the same reasons as is independent claim 24.

Independent claim 44 has been amended to include the limitations of “using only one imaging device” to perform operations recited in steps (b) through (f) of claim 44. The Examiner rejected claim 44 in view of the combination of Sukthankar with Geng, which discloses multiple imaging devices to perform the cited steps. Though Geng discloses an embodiment using only one imaging device, that embodiment is incompatible with Sukthankar. Specifically, if the one camera were the projection lens, as disclosed by Sukthankar, then the triangulation method of Geng would fail. If the separate, arbitrarily placeable camera of Sukthankar were used, the triangulation method of Geng would similarly fail because the relative position of the camera and projector would be unknown to the computer software. Thus, one of ordinary skill in the art would not combine Sukthankar with Geng because the three dimensional image detection method of Geng would not be functional using either one of Sukthankar’s disclosed cameras. Therefore, as amended, independent claim 44 patentably distinguishes over the cited prior art and, along with its dependent claims 45-48, should be allowable.

Independent claim 49 includes the limitations of an imaging device that is both “integral with said projector” and “free from being the projector optics from which said image is projected.

Therefore, independent claim 49, along with dependent claims 50-54 is distinguishable over the cited prior art for the same reasons as is independent claim 1, argued earlier in this response.

Independent claim 55 includes the limitation of “projecting said modified image from said projector, wherein said projector includes calibration parameters characterizing different optical settings of the projector optics.” The Examiner posits that this limitation is disclosed at col. 5 line 61 to col. 6 line 12 of Sukthankar. It is not. That passage of Sukthankar discloses that software may calibrate *the image screens stored on the computer* and projected through the projector so that if the projector were to shake or otherwise move, the imaging device would sense the movement of the projected image due to the difference between the sensed image and the calibrated stored image, and the computer could adjust the position of the image on the screen accordingly. At no point does the reference disclose calibration parameters *characterizing different optical settings of the projector optics*, as is required by the rejected claim. Therefore independent claim 55, along with its dependent claims 56-64 are patentably distinguished over the cited prior art and should be allowable.

Independent claim 65, as amended, is distinguishable over the cited prior art for the same reasons as are independent claims 10 and 18, argued above. Therefore independent claim 65, as well as its dependent claims 67-72 should be allowable.

Independent claim 78, as amended, is patentably distinguished over the cited prior art for the same reasons as are independent claims 1 and 49, argued above. Therefore claim 78, as well as its dependent claims 79-83, should be allowable.

Independent claim 84, as amended includes the limitation of “using an imaging device to sense at least two boundaries and no more than three boundaries defining a projection screen. As noted by the Examiner, Sukthankar discloses a method by which a keystone adjustment process depends on all four boundaries of a quadrilateral first being detected. *See* Sukthankar at col. 4 lines 34-36 (“To do this, the boundaries of the physical projection surface, which is a challenging computer-vision task, *must* be located”)(emphasis added) and col. 5 lines 14-17 (“The corrected image 20 must lie within the bounds of *this quadrilateral* and (for best viewing) should be as large as possible. This is equivalent to finding the largest *rectangle* with appropriate aspect ratio within the projected computer display”)(emphasis added). Therefore, independent claim 84 and its dependent claim 85 are patenatbly distinguished over the cited prior art and should be allowable.

In view of the foregoing amendments and remarks, the applicant respectfully requests reconsideration and allowance of claims 1-8, 10-26, 28-36, 38-65, 67-72, and 78-85.

Respectfully submitted,

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